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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/621,795	07/21/2000	Daniel N. Miller	LOCK1260-1	4580

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EXAMINER
KIM, TAE JUN

ART UNIT	PAPER NUMBER
3746	

DATE MAILED: 11/30/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/621,795	Applicant(s) MILLER ET AL.	
	Examiner Ted Kim	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 July 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Oath/Declaration

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

> The oath or declaration is defective because:
> It does not state that the person making the oath or declaration in a continuation-in-part application filed under the conditions specified in 35 U.S.C. 120 which discloses and claims subject matter in addition to that disclosed in the prior copending application, acknowledges the duty to disclose to the Office all information known to the person to be material to patentability as defined in 37 CFR 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

Drawings

2. Color photographs and color drawings are acceptable only for examination purposes unless a petition filed under 37 CFR 1.84(a)(2) or (b)(2) is granted permitting their use as formal drawings. In the event applicant wishes to use the drawings currently on file as formal drawings, a petition must be filed for acceptance of the photographs or color drawings as formal drawings. Any such petition must be accompanied by the appropriate fee as set forth in 37 CFR 1.17(i), three sets of drawings or photographs, as appropriate, and an amendment to the first paragraph of the brief description of the drawings section of the specification which states:

> The file of this patent contains at least one drawing executed in color. Copies of this patent with color drawing(s) will be provided by the Patent and Trademark Office upon request and payment of the necessary fee.

Color photographs will be accepted if the conditions for accepting color drawings have been satisfied.

Moreover, if applicant decides to continue the use of color drawings, applicant is required to provide a table to ascertain what the different color coding stands for.

3. The drawings are objected to because they do not photocopy well. It will be impossible to ascertain in Figs 1-6 what the flow patterns are due to the use of color in the originals. Applicant is required to show wherever possible the flow arrows for the injected fluid, e.g. in Fig. 2B, 3A-E.

4. The drawings are objected to because in Figure 5A-5C, the arrows for the yaw vectors and pitch vectors are not shown properly. For example, if Fig. 5B is a top down view, then the pitch vector should not be shown in the horizontal plane but should be directed into the page, e.g. compare with Fig. 5A. Applicant is required to correct the positioning of the vectors.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

32 (pg. 21, line 16Fig. 3A),

277 (pg. 38, line 14),

285 (pg. 38, line 20). Correction is required.

6. The drawings are objected to because in Fig. 1C, the leadlines for 16 and 18 are not drawn to the correct locations. For 18, it should be drawn to the yaw slots and for element 16 on the right of the Figure, there appears to be no reason for its existence.

7. The figures are objected to for using labeling for the x-y-z Cartesian coordinate system that is unclear or in error, e.g. in Fig. 2B, the axes are labeled x, y, z and o and it is unclear what applicant intends. See also Figs. 3B, etc.

In Fig. 2A, applicant labels Fig. 2B and it is unclear from where on Fig. 2A, Fig. 2B is derived.

8. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the rotational ability of the injectors (claim 9) must be shown and the variable geometry nozzle must be shown (claim 19), the secondary flow being fuel (claim 21) and serving as an afterburner (claim 22) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Specification

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. The specification is objected to for failing to provide an adequate written description. Due to the nature and number of inconsistencies between the drawings and the specification, applicant's specification is deemed inadequate to provide a clear description. Applicant's is required to carefully proofread his specification and correct and discrepancies not specifically identified above.

Another problem with the description arises on page 44, lines 22-27, where the additional flow from 308 is described as being aft of the sonic plane. However, Figure 12 clearly shows the additional flow from 308 is not aft of the sonic plane but upstream of the sonic plane. Hence, applicant's meaning is unclear.

11. Claims 1-30 are rejected under 35 U.S.C. 112, first paragraph, due to the failure to meet the written description requirement.

12. Claim 15 is rejected under 35 U.S.C. 112, first paragraph, because the specification, does not reasonably provide enablement for providing a symmetric flow to vector the primary flow (compare with claim 16). Symmetric flows by definition cannot provide vectoring. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims.

13. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

14. Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims are indefinite because there is no structure defined in the nozzle in which a throat should necessarily exist. There is no converging portion, diverging portion, throat, etc defined in the claims. In addition, "to

vary the effective throat" is a desired result as there is no structure recited that would necessitate this result occur.

- Claim 12, line 2, "said pulsed secondary flow" lacks proper antecedent basis.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claims 1-5, 10, 13-18, 20-22, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough (3,698,642) in view of either Ernst (3,294,323) or the AIAA paper of Miller et al. (AIAA 95-2603) of the IDS. McCullough teaches a nozzle having a primary flow, a primary injector 16, and a secondary injector 18, and valve controllers 22 to direct a flow to vary the effective throat area of the nozzle and perform thrust vectoring (top of col. 2). McCullough further teaches the use of fuel (col. 2, lines 26-28). Alternately, for the controllers, it is clear that the valves require a controller to actuate them. It would have been obvious to one of ordinary skill in the art to employ a software based controller in addition to the valves, in order to provide the necessary control over the thrust vectoring and/or throat control. McCullough do not teach the primary and secondary injectors are inclined to oppose the flow. Ernst teaches that it is old and well known in the thrust vectoring art to employ primary and secondary

injectors 1, 3 that are either angled perpendicular to the primary flow (Fig. 1) or inclined to oppose the flow (Fig. 3) and shows that the effective vector O can be increased by using opposed flow (compared Fig. 3 to Fig. 1). Miller et al. teach a fixed geometry exhaust nozzle used for gas turbine/turbofan engines (which inherently employ compressors) where the nozzle area is varied by a cross flow injected in the upstream direction (Figs. 2-5) in order to achieve a variable throat area. At the throat, the primary flow reaches the sonic condition. Miller shows on the cover sheet of the paper that the flows from the primary and secondary injectors can be angled to oppose the flow. It would have been obvious to one of ordinary skill in the art to incline the injectors of McCullough to oppose the flow, as taught by either Ernst or Miller et al, in order to enhance the effectiveness of the thrust vectoring and/or to employ an alternative means of vectoring well established in the art. As for using the nozzle with a jet engine aboard an aircraft, this is taught by the Miller paper. It would have been obvious to one of ordinary skill in the art to employ the nozzle with a jet aircraft, as a well known application of such a nozzle.

17. Claims 1-8, 10-22, 24, 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCullough (3,698,642) in view of either Ernst (3,294,323) or the AIAA paper of Miller et al. (AIAA 95-2603) of the IDS, as applied above, and further in view of either Kranz et al. (4,351,479) or Warren (3,204,405). McCullough teaches various aspects of applicant's claimed invention but does not teach the flow is pulsed. Kranz et al. teach a jet engine nozzle 7 having a plurality of injectors (a-f) spaced about

the housing, and valve controllers 36 associated with the injectors, the controller directing the injectors to provide an unsteady, i.e. pulsed, fluidic cross flow. The pulsed cross flow is injected to control the effective flow area, throttle and also vector the primary fluidic flow (see especially col. 5, lines 9 and following). The pulsed cross flow partially blocks the opening of the nozzle and can be either symmetric (area control) or asymmetric (thrust vectoring) as desired. Please note that as the effective flow area for the primary fluid flow is controlled, the temperature and pressure of the primary gas is inherently controlled by variation of the primary fluid flow velocity. The pulsed cross flow controller inherently controls the frequency, amplitude and wave form of the pulses. Kranz et al. teach that by employ pulsed flow, more effective deflection of the incoming flow is achieved (col. 1, lines 7 and following). Warren et al teach a thrust vectoring system for a reaction engine where pulsed flow (col. 9, lines 2 and following, especially circa line 63) is injected at the throat (e.g. Fig. 6a, 11, 121) to provide vectoring of the primary fluid. Warren also teach that the pulsed fluid can be fuel. It would have been obvious to one of ordinary skill in the art to employ pulsed flow of the cross flow injected by McCullough, as taught by either Kranz et al. or Warren et al, to more effective control the cross flow penetration of McCullough, and to enhance the thrust vectoring ability. As for using an acoustic vibrator, such devices are old and well known as flow control devices in nozzles. It would have been obvious to one of ordinary skill in the art to employ an acoustic vibrator, as an equivalent pulsing device. As for making the nozzle variable rather than fixed, this is old and well known in the art, as taught by Thayer who

uses a variable nozzle in combination with the fluidics for thrust vectoring. It would have been obvious to one of ordinary skill in the art to employ a variable nozzle, as an old and well known type of nozzle utilized in the thrust vectoring art.

18. Claims 1-5, 10, 13-18, 20, are rejected under 35 U.S.C. 103(a) as being unpatentable over the AIAA paper of Miller et al. (AIAA 95-2603) of the IDS in view of McCullough (3,698,642). Miller et al. teach a fixed geometry exhaust nozzle used for gas turbine/turbofan engines (which inherently employ compressors) where the nozzle area is varied by a cross flow injected in the upstream direction (Figs. 2-5) in order to achieve a variable throat area. At the throat, the primary flow reaches the sonic condition. Miller et al show on the cover sheet of the paper that the flows from the primary and secondary injectors can be angled to oppose the flow. Miller et al. do not teach thrust vectoring. However, it is clear that in a fixed nozzle, thrust vectoring capacities are generally required in order to steer the nozzle, especially in a military aircraft. McCullough teaches a nozzle having a primary flow, a primary injector 16, and a secondary injector 18, and valve controllers 22 to direct a flow to vary the effective throat area of the nozzle and perform thrust vectoring (top of col. 2). McCullough further teaches the use of fuel (col. 2, lines 26-28). Alternately, for the controllers, it is clear that the valves require a controller to actuate them. It would have been obvious to one of ordinary skill in the art to employ a software based controller in addition to the valves, in order to provide the necessary control over the thrust vectoring and/or throat control. It would have been obvious to one of ordinary skill in the art to both control the throat area

and thrust vector the nozzle of Miller et al, as taught by McCullough, in order to add vectoring capabilities to the nozzle of Miller et al.

19. Claims 1-8, 10-22, 24, 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the AIAA paper of Miller et al. (AIAA 95-2603) of the IDS in view of McCullough (3,698,642), as applied above and further in view of either Kranz et al. (4,351,479) or Warren (3,204,405). Miller et al teach various aspects of applicant's claimed invention but does not teach pulsing the flows nor the flows being fuel. Kranz et al. teach a jet engine nozzle 7 having a plurality of injectors (a-f) spaced about the housing, and valve controllers 36 associated with the injectors, the controller directing the injectors to provide an unsteady, i.e. pulsed, fluidic cross flow. The pulsed cross flow is injected to control the effective flow area, throttle and also vector the primary fluidic flow (see especially col. 5, lines 9 and following). The pulsed cross flow partially blocks the opening of the nozzle and can be either symmetric (area control) or asymmetric (thrust vectoring) as desired. Please note that as the effective flow area for the primary fluid flow is controlled, the temperature and pressure of the primary gas is inherently controlled by variation of the primary fluid flow velocity. The pulsed cross flow controller inherently controls the frequency, amplitude and wave form of the pulses. Kranz et al. teach that by employ pulsed flow, more effective deflection of the incoming flow is achieved (col. 1, lines 7 and following). Warren et al teach a thrust vectoring system for a reaction engine where pulsed flow (col. 9, lines 2 and following, especially circa line 63) is injected at the throat (e.g. Fig. 6a, 11, 121) to provide vectoring of the

primary fluid. Warren also teach that the pulsed fluid can be fuel. It would have been obvious to one of ordinary skill in the art to employ pulsed flow of the cross flow injected by Miller et al, as taught by either Kranz et al. or Warren et al, to more effective control the cross flow penetration, and to enhance the thrust vectoring ability. As for using an acoustic vibrator, such devices are old and well known as flow control devices in nozzles. It would have been obvious to one of ordinary skill in the art to employ an acoustic vibrator, as an equivalent pulsing device. As for making the nozzle variable rather than fixed, this is old and well known in the art, as taught by Thayer who uses a variable nozzle in combination with the fluidics for thrust vectoring. It would have been obvious to one of ordinary skill in the art to employ a variable nozzle, as an old and well known type of nozzle utilized in the thrust vectoring art.

20. Claims 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of the previously applied prior art, as applied above, and further in view of the Paper by Gunter et al. The above prior art do not specifically teach the secondary injection nozzles operated at sonic or supersonic conditions. Gunter et al. teach using secondary injection including cross flow (e.g. Fig. 8, pg. 58) and that it is old and well known in the art to operate the secondary injection nozzles at sonic or supersonic conditions (Fig. 32, page 94) which enhances flow stability by preventing flow disturbances from propagating back to the secondary injection nozzle source. It would have been obvious to one of ordinary skill in the art to operate the injection nozzles at the throat at sonic or supersonic

conditions, in order increase the rate amount of fluid injection and/or to promote flow stability for the secondary injection nozzles.

21. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over any of the previously applied prior art, as applied above, and further in view of Rich (2,952,123). The prior art teach applicant's claimed invention except for the cross flow injectors having a variable angle fuel. Rich teaches the use of cross flow injectors 77 which inject fuel into the primary flow. Rich teaches by injecting fuel with a variable angle into the primary flow, the thrust can be augmented (col. 1, lines 65 and following) and the mixing can be optimized. It would have been obvious to one of ordinary skill in the art to inject fuel into the flow, as taught by Rich, in order to optimize the mixing characteristics.

22. Claim 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of the above prior art as applied to claim 26 above, and further in view of either Terrier (5,665,415) or Justice (6,00,635). The above prior art teach various aspects of applicant's claimed invention but do not teach the ultra high aspect ratio biconvex or trapezoid aperture nozzle. Terrier teaches (fig. 8) that ultra high aspect ratio biconvex aperture nozzles are old and well known in the fixed nozzle art. Justice teaches that it is old and well known in the fixed nozzle art employ an ultra high aspect ratio trapezoid aperture nozzle 33B (col. 2, circa line 63). It would have been obvious to one of ordinary skill in the art employ either an ultra high aspect ratio biconvex or trapezoid aperture nozzle, as well known types of fixed nozzles utilized in the art.

Double Patenting

23. Claims 1-27 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-53 of U.S. Patent No. 6,112,512. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of U.S. Patent No. 6,112,512, e.g. claim 17 in combination with claim 1 contains all the claim limitations of at least claim 1 of the instant application. Similarly, claim 49 combined with claim 47 of U.S. Patent No. 6,112,512 contain all the method steps of claim 26 of the instant application.

24. Claims 28-30 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 49 (with claim 47) of U.S. Patent No. 6,112,512 in view of either Terrier or Justice. The method claims of U.S. Patent No. 6,112,512 do not teach the ultra high aspect ratio biconvex or trapezoid aperture nozzle. Terrier teaches (fig. 8) that ultra high aspect ratio biconvex aperture nozzles are old and well known in the fixed nozzle art. Justice teaches that it is old and well known in the fixed nozzle art employ an ultra high aspect ratio trapezoid aperture nozzle 33B (col. 2, circa line 63). It would have been obvious to one of ordinary skill in the art employ either an ultra high aspect ratio biconvex or trapezoid aperture nozzle, as well known types of fixed nozzles utilized in the art. As for the use of slots or arrays, these are both notoriously old types of nozzles utilized in this art. It would have been obvious to one of ordinary skill in the art to employ slot injectors or arrays of injectors, as is well known in this art.

Contact Information

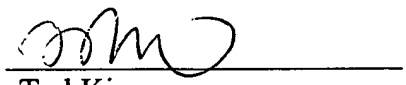
Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 703-308-2631. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax numbers for the organization where this application is assigned are 703-872-9302 for Regular faxes and 703-872-9303 for After Final faxes.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Thorpe, can be reached on 703-308-0102.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861.

General inquiries can also be directed to Technology Center Customer Service Office at 703-306-5648 or the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at http://www.uspto.gov/main/patents.htm



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